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Creating A Greener Energy Future For the Commonwealth

Solar RPS Carve-Out STRAW PROPOSAL

Public Stakeholder Meeting

Boston, MA
August 26, 2009

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What is a Solar RPS Carve-Out?

- Certain percentage of RPS Class I mandate must be met by all obligated retail electricity suppliers with solar photovoltaic electricity.
- Each megawatt hour (1000 kWh) that a solar PV system generates is recorded, and one Solar Renewable Energy Certificate (S-REC) is created.
- As with RPS Class I, S-RECs are created and traded on the New England Generation Information System (NE-GIS) platform.
- Solar PV system owners can sell their S-RECs
- Utilities use the S-RECs to meet their RPS Solar Carve-Out obligation.

Goals and Objectives

Creating the Solar Carve-Out in the Massachusetts RPS

- Sustain long-term growth of solar market
- Develop smooth transition from upfront rebate-only incentives to production-based, market priced S-RECs
- Cultivate solar development across multiple sectors and generator sizes (residential, commercial, and utility-scale)
- Develop a sustainable solar market that reduces dependence on state subsidies
- Minimize ratepayer impacts

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Green Communities Act

Creating the DG Carve-Out in the Massachusetts RPS

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SECTION 32, Section 11F.

(g) In satisfying its annual obligations under subsection (a), each retail supplier shall provide a portion of the **required minimum percentage of kilowatt-hours sales** from new on-site renewable energy generating sources **located in the commonwealth** and having a power production capacity of **not more than 2 megawatts** which began commercial operation after December 31, 2007, including, but not limited to, behind the meter generation and other similar categories of generation determined by the department. The portion of the required minimum percentage required to be supplied by such on-site renewable energy generating sources shall be established by the department; provided, however, that the **department may specify that a certain percentage** of these requirements shall **be met through energy generated from a specific technology** or fuel type.

(h) The department shall adopt regulations allowing for a retail supplier to discharge its obligations under subsection (g) by making an alternative compliance payment in an amount established by the department; provided, however, that the **department shall set on-site generation alternative compliance payment rates at levels that shall stimulate the development of new on-site renewable energy generating sources**. (i) A municipal lighting plant shall be exempt from the obligations under this section so long as and insofar as it is exempt from the requirements to allow competitive choice of generation supply under section 47A of chapter 164.

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Balancing Primary Design Considerations

- Stimulate and Sustain Market: Establish Minimum Standard to create sustained demand growth for solar installations to meet Governor's goal of 250 MW by 2017.
- Enable Sufficient Solar Market Prices: Establish S-ACP rate to provide sufficient financial value to PV suppliers to maintain industry growth.
- Control Project Risk and Reduce Costs to Ratepayers: Enable long term financial value of S-RECs to mitigating project risk to PV investors and to reduce costs to ratepayers.
- Enable Market Transition: Address market stability and growth as Solar RPS Carve-Out is phased in to replace rebate program.
- Maintain Diverse Market Opportunities: Providing sufficient support to maintain market opportunities for all segments including residential sector.

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Experiences from Other State Solar RPS Programs

	New Jersey	Maryland	Pennsylvania
ACP Levels	•'08-'09 $711/MWh •'15-'16 $594/MWh •Trading at $500	•'09 $400/MWh •'23 $50/MWh •Trading at $375	•200% of avg. S-REC price •'08 $528/MWh •Trading at $300
Securitization	•10 to 15 yr contract with utility •Solar Loan Program	•15 year contract	No regulated long term contracts
Incentive for Residential	•Yes, up to 10kW. •Rebates of up to $1.75/watt.	•Yes, up to 10kW. •Rebates of up to $10,000 per system.	•Yes, up to 10kW. •$2.25 declines 50 cents every 10MW installed.
Incentive for non-Residential	•Yes, up to 50kW. •Rebates of $1.00/watt	•Yes, up to 10kW. •Rebates of up to $10,000 per system.	•Yes, 3kW to 200kW. •Rebates of about $2/watt declines every 5MW installed.

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Lessons Learned from Other State Programs

- Plan for transition to solar carve-out before the rebate money runs out, avoiding boom and bust cycle by planning in sufficient time for next program phase.
- Transparency is key. S-REC owners should have easy access to post and sell certificates, and to observe at what prices S-RECs are trading.
- With one S-ACP level, it is hard to stimulate each segment of the market. May need to provide incentives for smaller projects in additional to S-RECs.
- Securitization important for all projects, and also serves to reduce project risk and reduce costs to ratepayers.

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Deriving the Minimum Standard

Creating Demand for Solar Energy in Massachusetts

- An RPS Minimum Standard specifies the percent of a retail electricity suppliers load obligation that must be met with renewable energy attributes (as contained in RECs). For example, the MA RPS Class I Minimum Standard is 4% in 2009.
- The Solar RPS Carve-Out Minimum Standard concerns that portion of the RPS Class I Minimum Standard that must be met explicitly with solar PV attributes (as contained in S-RECs), thereby creating a market demand.
  - For example, a 5% RPS Minimum Standard with a 0.05% Solar Carve-Out Minimum Standard, will require Retail Electric Supplies to meet 0.05% of their Load Obligation with S-RECs and 4.95% with Class I RECs.
- MA Solar Carve-Out Minimum Standard is derived to expand market growth beyond the other existing solar programs, to meet the Governor's goal of 250 MW by 2017.
  - Other programs include Commonwealth Solar rebate program, utility owned solar, and federal stimulus projects.

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Deriving the Minimum Standard

Creating Demand for Solar Energy in Massachusetts

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Cumulative Installations (MW)

Year	Utility Ownership and Federal Stimulus Programs	Comm Solar Rebate Program *	RPS Solar Carve Out	TOTAL - All Programs	Annual Growth Rate	S-RECs ** (MWh)	Solar RPS Minimum Standard ***
2009	0	15		15			
2010	9	20	3	32	113%	3,416	**0.007%**
2011	20	24	4	48	50%	4,555	**0.009%**
2012	23	24	16	63	32%	18,444	**0.036%**
2013	23	24	36	83	32%	41,228	**0.080%**
2014	23	24	63	110	32%	71,226	**0.139%**
2015	23	24	97	144	32%	110,720	**0.216%**
2016	23	24	143	190	32%	162,717	**0.317%**
2017	23	24	203	250	32%	231,176	**0.450%**
2018	23	24	282	329	32%	321,309	**0.625%**
2019	23	24	386	433	32%	439,976	**0.856%**
2020	23	24	524	571	32%	596,212	**1.161%**

* Inclusive of ~5MW of pre-2007 installations

** Assumes a 13% Capacity Factor

*** Assumes a constant (no-growth) MA Load Obligation of 51,371,000 MWh

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Deriving the Solar ACP Rate

Providing Sufficient Financial Value

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Considerations

- Provide Sufficient Rate of Return: S-ACP Rate needs to be sufficiently high to provide acceptable rate of return to project owners, but without unnecessarily burdening ratepayers.
- Singular S-ACP Rate Does not Discriminate by Project Size: Unlike rebate program, solar RPS carve-out subsidy does not differentiate by project size or $/W installed cost.
- Declining Rate Accommodate PV Cost Reductions: A declining S-ACP Rate is well match to the expected decrease in PV costs over time.
- S-ACP Rate vs Market Price: Market price for S-RECs primarily depends on S-ACP Rate and the Minimum Standard.

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Sample Solar Alternative Compliance Payment (S-ACP) Rate Schedules

Year	Steady ACP		Declining ACP	
	ACP Rate ($/MWh)	Maximum Cost to Ratepayers (million $)	ACP Rate ($/MWh)	Maximum Cost to Ratepayers (million $)
2009				
2010	600	$ 1.89	850	$ 2.68
2011	600	$ 8.83	765	$ 11.26
2012	600	$ 18.46	689	$ 21.18
2013	600	$ 31.37	620	$ 32.40
2014	600	$ 47.62	558	$ 44.26
2015	600	$ 68.06	502	$ 56.93
2016	600	$ 93.78	452	$ 70.61
2017	600	$ 126.14	407	$ 85.47
2018	600	$ 166.86	366	$ 101.76
2019	600	$ 218.10	329	$ 119.70
2020	600	$ 282.57	296	$ 139.58
NPV (@ 12% discount rate)		$ 3,563 $ 408		$ 3,515 $ 283

Both Schedules provide equal project Rate of Return*

RoR ~ 15½% for project installed at $6/W in 2010.

Declining S-ACP leads to lower cost to ratepayers and encourages project development earlier.

*Based on MRET Financial Model (tax benefits and 100% equity financing)

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Proposed S-ACP Rate Schedule

Year	Proposed S-ACP	
	S-ACP Rate ($/MWh)	Maximum Cost to Ratepayers (million $)
2009		
2010	**700**	$ 2.21
2011	**700**	$ 10.30
2012	**650**	$ 20.00
2013	**650**	$ 33.99
2014	**585**	$ 46.43
2015	**527**	$ 59.72
2016	**474**	$ 74.06
2017	**426**	$ 89.66
2018	**384**	$ 106.74
2019	**345**	$ 125.57
2020	**311**	$ 146.42
NPV (@ 12% discount rate)	$ 3,383	$ 293

Schedule begins with step decrease in S-ACP rate, followed by a constant 10%/year decrease.

Schedule provides RoR = 15% for project installed at $6/W in 2010.

S-ACP rate in first years considers federal stimulus activity in 2010-2011 timeframe.

Post-2020: DOER will announce S-ACP rate for each additional year starting in 2015; or else S-ACP rate will expire and join ACP RPS Class I rate.

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Securitizing Long-Term S-REC Revenues

Enabling Project Financing and Mitigating Risks

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Justification

- Critical Need for Project Financing: Project economic viability requires robust S-REC revenues, though project financers will greatly devalue price/revenue projections in long term spot market.
- Reduce PV Investors Hurdle Rate of Return: Mitigating risk of S-REC revenues reduces financial hurdle rate required by project investors.
- Reduce Costs to Ratepayer: Reducing project hurdle rates and maintaining S-REC long-term contract prices substantially below S-ACP rate, mitigates ratepayer exposure to high costs.

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Securitizing Long-Term S-REC Revenues

Enabling Project Financing and Mitigating Risks

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Role of the Utilities

- DOER recognizes a critical role of the utility companies to provide S-REC securitization role.
- Key Principles
  - Securitization should maintain market competitiveness to provide S-RECs at least cost to ratepayers.
  - Securitization shifts risk from PV investors to utilities/ratepayers, and should consider risk management through diversification/portfolio of S-REC revenue streams.

Securitizing Long-Term S-REC Revenues

Enabling Project Financing and Mitigating Risks

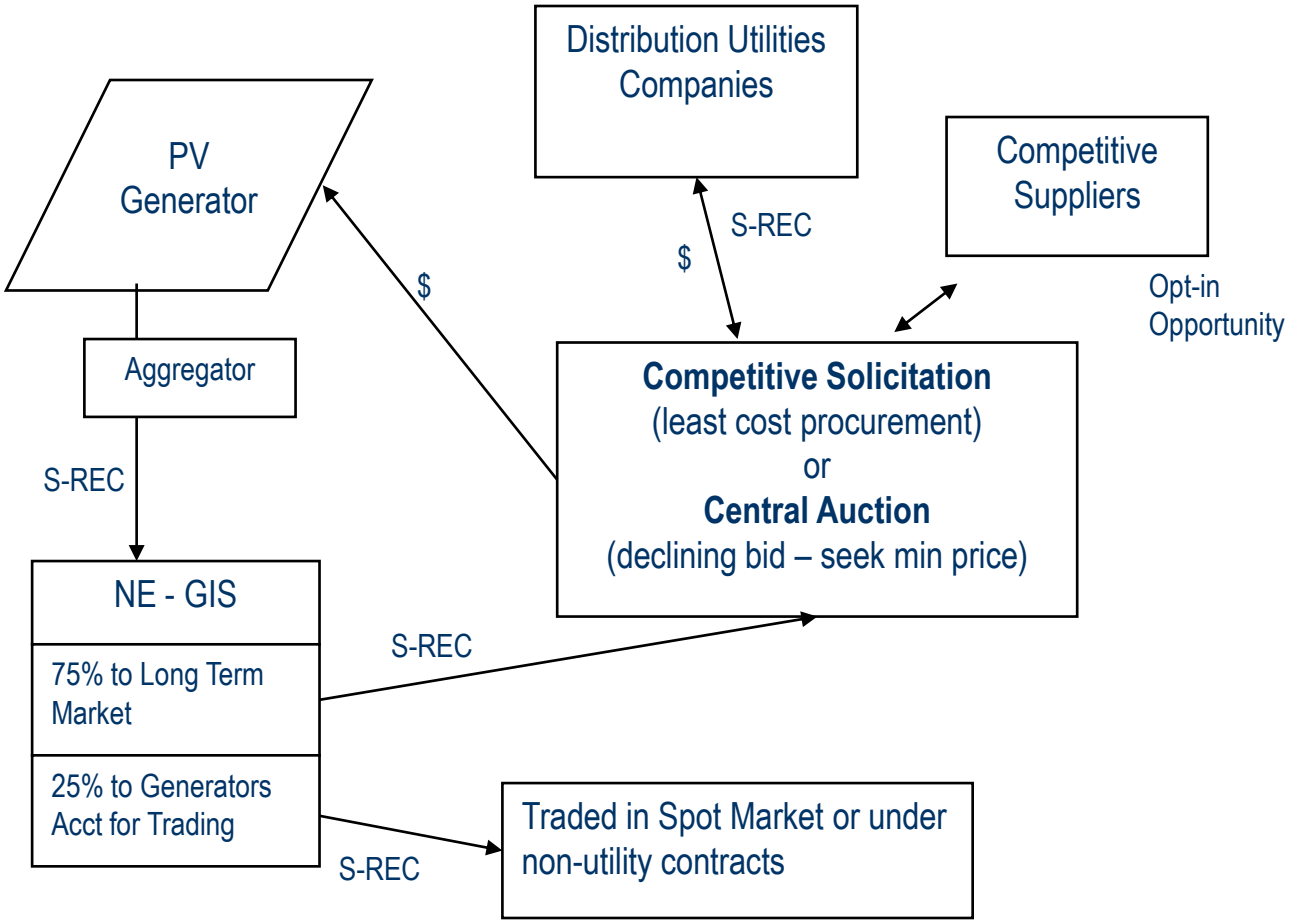
Ideas for Utility Securitization

- Distribution utilities procure ~75% of their projected S-REC compliance obligation (if supply is available) through long term contracts. Two concepts are as follows.
- Least-Cost Competitive Procurement: Distribution utilities extend periodic, competitive solicitations for 10-year S-REC contracts with generators. Generators offer price and volume schedules for 10-year contracts. A central procurement entity, working on behalf of the utilities, could be established to efficiently manage the solicitations.
- Central Auction: Distribution utilities bid on 10-year S-REC offers from generators in periodic central auction. Auction designed to minimize S-REC clearing price, and to address potential collusive behavior.

Securitizing Long-Term S-REC Revenues

Enabling Project Financing and Mitigating Risks

Schematic of Utility Long-Term S-REC Procurement



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Ensuring an Effective Market Transition

Moving from Comm Solar Rebates to RPS Carve-Out

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- Commonwealth Solar Rebate program was initially designed with a 4-year, $68 million scope.
  - Commonwealth Solar Rebate program has met expectations and has been successful in creating early market growth in MA PV businesses and installations.
  - Solar RPS Carve-Out is necessary next step to sustain market expansion to meet Governor's goal.
  - Transition goal is to substantially scale-up growth by moving to ratepayer based (RPS) performance incentive, as we wean away from rebates before hitting abrupt budget constraints.

- <u>Proposed Transition Plan</u>
  - For Year 2010, transition from rebates to SRECs will be put into place for different size projects at prescribed rebate levels.
  - DOER will work with MRET to design a compatible transitional rebate program for 2010.

Maintaining Markets for Small/Residential PV

- RPS Solar Carve-Out may not provide sufficient incentive for residential scale projects.
- Despite greater cost, residential market is important sector for solar industry and for constituents.

- <u>Proposed Residential Market Plan</u>
  - Commonwealth Solar Rebates will continue to be available for Residential installations at a reduced level.
  - MRET will plan to continue such rebates for a 5-year horizon.
  - MRET will provide aggregation services for residential market to efficiently engage in S-REC markets, if necessary.

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Next Steps and Implementation Schedule

Goal: Establish Solar RPS Carve-Out Program to begin 1/1/2010

Receive Stakeholder Written Comments on "Straw Proposal"

Comments Due: September 9, 2009

Send comments to susan.leavitt@state.ma.us

Key Activities

- Complete program design and issue Draft Regulations* 10/2009
- Hold Public Hearing on draft regulations 11/2009
- Promulgate regulations 12/31/2009

* Regulations will be revisions to existing RPS Class I Regulations